

WHAT IS CLAIMED IS:

SUB A2/

1. A method for representing cartographic data in a computer-based system, comprising:
 - computing a plurality of wavelet and scaling coefficients corresponding to at least one function representing a geographic feature in a cartographic database; and
 - storing the wavelet and scaling coefficients in a computer-usable database, the coefficients being usable for representing the cartographic data in the computer-based system.
2. The method of claim 1, wherein the geographic feature is originally represented by a plurality of data points.
3. The method of claim 2, wherein the data points are selected from the group consisting of coordinate pairs and a coordinate triples.
4. The method of claim 1, wherein the geographic feature is the boundary of a feature selected from the group consisting of a road, waterway, building, park, lake, railroad track, and airport.
5. The method of claim 2, wherein the step of computing the wavelet coefficients and scaling coefficients includes applying a wavelet transform to a function defined by the data points representing the geographic feature.
6. The method of claim 1, wherein the step of computing the wavelet coefficients and scaling coefficients includes:
 - computing the wavelet coefficients by performing a least-squares fit.
7. The method of claim 1, wherein the wavelet and scaling coefficients are computed using a semi-discrete orthonormal wavelet transform.

1 8. A method of displaying on a computer output device a function representing a
2 geographic feature, comprising:
3 retrieving from a computer-usable database a plurality of wavelet and scaling
4 coefficients associated with the geographic feature, the coefficients being derived from a
5 plurality of data points specifying geographic locations according to a predetermined reference
6 system;
7 computing the function using the retrieved wavelet and scaling coefficients; and
8 displaying the function on the computer output device.
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1 9. The method of claim 8, wherein the data points are selected from the group
2 consisting of coordinate pairs and a coordinate triples.
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1 10. The method of claim 8, wherein the geographic feature is selected from the group
2 consisting of a road, waterway, building, park, lake, railroad track, and airport.
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1 11. A system for displaying on a computer output device a representation of a
2 geographic feature, comprising:
3 a database storing a plurality of wavelet and scaling coefficients associated with
4 the geographic feature, the wavelet and scaling coefficients being derived from a plurality of
5 data points specifying geographic locations according to a predetermined reference system;
6 a processor configured to calculate a function using the wavelet and scaling
7 coefficients, the function representing the geographic feature; and
8 a display device for displaying the function.
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1 12. The system of claim 11, wherein the data points are selected from a group
2 consisting of coordinate pairs and coordinate triples.
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1 13. A method of generating a computer-usable database that represents cartographic
2 data using a plurality of wavelet and scaling coefficients, comprising:

3 providing a predetermined database that represents the cartographic data using a
4 plurality of data points specifying geographic locations;

5 computing a plurality of wavelet and scaling coefficients from the data points; and
6 storing the wavelet and scaling coefficients in the computer-usable database.

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1 14. The method of claim 13, wherein the data points are selected from the group
2 consisting of coordinate pairs and coordinate triples.

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4 15. The method of claim 13, wherein the geographic feature is the boundary of a
5 feature selected from the group consisting of a road, waterway, building, park, lake, railroad
6 track and airport.

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8 16. A system for generating a computer-usable database that represents cartographic
9 data using a plurality of wavelet and scaling coefficients, comprising:

10 a first computer-usable database storing the cartographic data represented using a
11 plurality of data points specifying geographic locations;

12 a processor configured to compute a plurality of wavelet and scaling coefficients
13 from the data points; and

14 a second computer-usable database, operatively coupled to the processor, for
15 storing the wavelet and scaling coefficients.

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1 17. The system of claim 16, wherein the data points are selected from the group
2 consisting of coordinate triples and coordinate pairs.

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4 18. The system of claim 16, wherein the wavelet coefficients and scaling coefficients
5 are computed by applying a wavelet transform to a function defined by the data points
6 representing a geographic feature.

1 19. The system of claim 16, wherein the wavelet coefficients are computed by
2 performing a least-squares fit.
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1 20. A method for generating a database error metric in a computer-based system,
2 comprising:
3 computing a first plurality of wavelet and scaling coefficients from a plurality of
4 first data points included in a first cartographic database;
5 computing a second plurality of wavelet and scaling coefficients from a plurality
6 of data points included in a second cartographic database; and
7 generating the database error metric based on a wavelet transform involving the
first and second pluralities of wavelet coefficients.

1 21. The method of claim 20, wherein the error metric is a total error metric based on a
2 plurality of wavelet scales.
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1 22. The method of claim 20, further comprising:
2 selecting a wavelet scale; and
3 restricting the error computation to the selected wavelet scale to generate a layer
4 error metric.
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1 23. The method of claim 14, wherein the data points are selected from the group
2 consisting of coordinate pairs and coordinate triples.
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1 24. A system for generating a database error metric, comprising:
2 a first cartographic database for storing a first plurality of data points;
3 a second cartographic database for storing a second plurality of data points; and
4 a processor, operatively coupled to the first and second cartographic databases,
5 configured to compute a first plurality of wavelet and scaling coefficients and a second plurality
6 of wavelet and scaling coefficients, respectively, from the first and second pluralities of data
7 points, the processor generating a database error metric based on the first and second pluralities
8 of wavelet and scaling coefficients.

1 25. The system of claim 23, wherein the error metric is a total error metric based on a
2 plurality of wavelet scales.

1 26. The system of claim 24, wherein the processor is configured to restrict the error
2 computation to a selected wavelet scale to generate a layer error metric.

1 27. The system of claim 24, wherein the data points are selected from the group
2 consisting of coordinate triples and coordinate pairs.

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